

Study Guide

Student Edition
Pages 514–521**Polygons**

A **polygon** is a plane figure formed by a finite number of segments such that (1) sides that have a common endpoint are noncollinear and (2) each side intersects exactly two other sides, but only at their endpoints. A **convex polygon** is a polygon such that no line containing a side of the polygon contains a point in the interior of the polygon. Convex polygons with all sides congruent and all angles congruent are called **regular**.

The following two theorems involve the interior and exterior angles of a convex polygon.

Interior Angle Sum Theorem	If a convex polygon has n sides and S is the sum of the measures of its interior angles, then $S = 180(n - 2)$.
Exterior Angle Sum Theorem	If a polygon is convex, then the sum of the measures of the exterior angles, one at each vertex, is 360.

Example: Find the sum of the measures of the interior angles of a convex polygon with 13 sides.

$$S = 180(n - 2) \quad \text{Interior Angle Sum Theorem}$$

$$S = 180(13 - 2)$$

$$S = 180(11)$$

$$S = 1980$$

Find the sum of the measures of the interior angles of each convex polygon.

1. 10-gon

2. 16-gon

3. 30-gon

The measure of an exterior angle of a regular polygon is given. Find the number of sides of the polygon.

4. 30

5. 20

6. 5

The number of sides of a regular polygon is given. Find the measures of an interior angle and an exterior angle for each polygon.

7. 18

8. 36

9. 25

10. The measure of the interior angle of a regular polygon is 157.5. Find the number of sides of the polygon.